

REMARKS

Applicant acknowledges receipt of an Office Action dated June 29, 2007. In this response, Applicant has amended claims to correct minor informalities and better conform the claims to U.S. practice. Claims 26-27 were rewritten in independent form. Following entry of this amendment, claims 1-33 are pending in the application.

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Specification

On page 2 of the Office Action, the PTO objects to applicant's statements on lines 17 and 18 of page 25 of the specification which allegedly "seems to categorize the invention as working like a perpetual motion machine." Applicant has amended the specification to eliminate any characterizations of the presently claimed invention as a perpetual motion machine.

Claim Objections

On page 3 of the Office Action, the PTO has objected to claims 26-27 under 37 CFR §1.75(c) for allegedly failing to limit the subject matter of a previous claim. Applicant has rewritten claims 26 and 27 in independent form.

Rejection Under 35 U.S.C. §102

On page 3 of the Office Action, the PTO has rejected claims 1-4 under 35 U.S.C. §102(b) as allegedly being anticipated by U.S. Patent 5,006,178 to Bijvoets (hereafter "Bijvoets"). In addition, on page 6 of the Office Action, the PTO has rejected claims 1-4 under 35 U.S.C. §102(b) as allegedly being anticipated by U.S. Publication Number 2003/0230332 to Venkatasubramanian *et al.* (hereafter "Venkatasubramanian"). Applicant respectfully traverses these rejections for at least the reasons set forth below.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). See generally MPEP §2131.

Bijvoets fails to disclose a thermoelectric effect device comprising:

connecting one of the electric conduction materials to a direct current source in-line constituting a Peltier effect heat transfer circuit system which has an endothermic section and an exothermic section, wherein between the endothermic section and the exothermic section, a distance is secured for so keeping a temperature T_{α} at the endothermic section and a temperature T_{β} at the exothermic section as to keep a relation $T_{\alpha} < T_{\beta}$ as recited in claim 1;

a thermoelectric effect device comprising:

connecting at least a part of the electric conduction material to a direct current source in-line constituting a Peltier effect heat transfer circuit system which has n piece of the endothermic section and n piece of the exothermic section, wherein: between the endothermic section and the exothermic section, a distance is secured for so keeping a temperature T_{α} at the endothermic section and a temperature T_{β} at the exothermic section as to keep a relation $T_{\alpha} > T_{\beta}$ as recited in claim 2;

an energy direct conversion system comprising:

the first thermoelectric converter element and the second thermoelectric converter element being disposed in ambient temperatures different from each other, and a distance being secured for so keeping an ambient temperature T_1 of the thermoelectric converter element on a high temperature side and an ambient temperature T_2 of the thermoelectric converter element on a low temperature side as to keep a relation $T_1 > T_2$, wherein: taking out an electric potential energy from a certain section of the electric conduction material constitutes a direct energy conversion electric circuit system converting from a heat energy into the electric potential energy as recited in claim 3; and

an energy direct conversion system comprising:

2n pieces of the thermoelectric converter elements adjacent to each other being disposed alternately, thus forming ambient temperatures different from each other, and a distance being secured for so keeping an ambient temperature T_1 of the thermoelectric converter element on a high temperature side and an ambient temperature T_2 of the thermoelectric converter element on a low temperature side as to keep a relation $T_1 > T_2$, wherein: taking out an electric potential energy from a certain section of the electric conduction material constitutes a direct energy conversion electric circuit system converting from a heat energy into the electric potential energy as recited in claim 4.

Bijvoets discloses a thermoelectric system that is not physically realizable. Bijvoets specifies that “thermoelectric effects are created in the bridges 5 ... [a]s a result hardly any or no thermoelectric effects at all are created in the intermediate pieces 9.” Col. 3, lns. 11-18. This assertion is physically incorrect. Bijvoets also states that “intermediate pieces 9 are used which, dependent on the conductivity type of the end pieces 8 or 10, will behave as P-type or N-type material.” Col. 4, lns. 16-19. These statements in Bijvoets are entirely incorrect as to the physical and functional properties of thermoelectric effects and physical properties of the semiconductor and metals such as copper. Furthermore, Bijvoets provides that the “thickness of the end pieces 8, 10 is in the order of magnitude of several μm and they may consist of the usual semiconductor material, such as BiTe. Said thickness of the layer is about 0.1% of the conventional length of the element half, as a result of which the losses W_2 of joule heat of the semiconductor material are reduced by the same order of magnitude.” Col. 4, lns. 24-30.

In each element construction of the Figure of Bijvoets, the heat stream within end pieces 8, 10 of the semiconductor part at the side of reference numeral 3 becomes larger than the heat stream within intermediate pieces 9, such as copper, by 3.7 times. Due to the well known heat stream, the heat generation quantities at both junction surfaces of bridge 5 and end pieces 8 and of bridge 5 and end piece 10, are mutually cancelled by heat absorption quantities of both junction surfaces of intermediated pieces 9 and end piece 8, and intermediate pieces 9 and end piece 10. Therefore, bridge 5 is not at a high temperature. The same phenomenon occurs at the side of reference numeral 2. Thus, the temperature difference between two bridges 5 at the side of 3 and at the side of 2 in the drawing as described within Bijvoets does not occur and the temperature difference between two bridges 5 at the side of 3 and 2 according to the Peltier effect is physically and functionally impossible.

Consequently, and for at least these reasons, Bijvoets does not anticipate the presently claimed invention.

Venkatasubramanian fails to disclose a thermoelectric effect device “connecting one of the electric conduction materials to a direct current source in-line constituting a Peltier effect heat transfer circuit system which has an endothermic section and an exothermic section” as recited in claim 1; a thermoelectric effect device “connecting at least a part of the electric conduction material to a direct current source in-line constituting a Peltier effect heat

transfer circuit system which has n piece of the endothermic section and n piece of the exothermic section” as recited in claim 2; and an energy direct conversion system comprising “a distance being secured for so keeping an ambient temperature T1 of the thermoelectric converter element on a high temperature side and an ambient temperature T2 of the thermoelectric converter element on a low temperature side as to keep a relation $T1 > T2$ ” as recited in claims 3 and 4.

Consequently, and for at least these reasons, Venkatasubramanian does not anticipate the presently claimed invention.

Applicant respectfully reserves the right to overcome this rejection by submitting a translation of the foreign priority papers filed prior to the filing date of Venkatasubramanian.

In view of the foregoing, Applicant respectfully requests reconsideration and withdrawal of the outstanding rejection under §102.

Rejection Under 35 U.S.C. §103

On page 7 of the Office Action, the PTO has rejected claim 5 under 35 U.S.C. §103(a) as allegedly being unpatentable over Bijvoets in view of U.S. Patent 6,271,459 to Yoo (hereafter “Yoo”) and claims 6, 7, 26, and 27 as allegedly being unpatentable over Bijvoets in view of U.S. Patent 6,100,600 to Pflanz (hereafter “Pflanz”). On page 8 of the Office Action, the PTO has rejected claims 8-9, 11-12, 14-15, 17-18, 20-21, and 23-24 under 35 U.S.C. §103(a) as allegedly being unpatentable over Bijvoets in view of U.S. Patent 5,987,891 to Kim *et al.* (hereafter “Kim”). On page 10 of the Office Action, the PTO has rejected claims 10, 13, 16, 19, and 25 under 35 U.S.C. §103(a) as allegedly being unpatentable over Bijvoets in view of Yoo and further in view of Kim. On page 11 of the Office Action, the PTO has rejected claims 28-29, and 31-32 under 35 U.S.C. §103(a) as allegedly being unpatentable over Bijvoets in view of Kim and further in view of Pflanz. On page 12 of the Office Action, the PTO has rejected claims 30 and 33 under 35 U.S.C. §103(a) as allegedly being unpatentable over Bijvoets in view of Yoo and further in view of Kim and further in view of Pflanz. Applicant respectfully traverses these rejections for at least the reasons set forth below.

In order to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves

or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, prior art references must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in Applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).

Here, Bijvoets and Yoo, whether taken individually or in combination, fail to teach or suggest an energy direct conversion system comprising:

the first thermoelectric converter element and the second thermoelectric converter element being disposed in ambient temperatures different from each other, and a distance being secured for so keeping an ambient temperature T1 of the thermoelectric converter element on a high temperature side and an ambient temperature T2 of the thermoelectric converter element on a low temperature side as to keep a relation $T1 > T2$, wherein: taking out an electric potential energy from a certain section of the electric conduction material constitutes a direct energy conversion electric circuit system converting from a heat energy into the electric potential energy

as required by claim 5.

For at least this reason, Applicant submits that the outstanding rejection based upon the combination of Bijvoets and Yoo is improper and ought to be withdrawn.

Here, Bijvoets and Pflanz, whether taken individually or in combination, fail to teach or suggest an energy direct conversion system comprising:

a distance being secured for so keeping an ambient temperature T1 of the thermoelectric converter element on a high temperature side and an ambient temperature T2 of the thermoelectric converter element on a low temperature side as to keep a relation $T1 > T2$, wherein: taking out an electric potential energy from a certain section of the electric conduction material constitutes a direct energy conversion electric circuit system converting from a heat energy into the electric potential energy as required by claims 6-7 and 26-27.

For at least this reason, Applicant submits that the outstanding rejection based upon the combination of Bijvoets and Pflanz is improper and ought to be withdrawn.

Here, Bijvoets and Kim, whether taken individually or in combination, fail to teach or suggest an energy direct conversion system comprising:

the first thermoelectric converter element and the second thermoelectric converter element being disposed in ambient temperatures different from

each other, and a distance being secured for so keeping an ambient temperature T_1 of the thermoelectric converter element on a high temperature side and an ambient temperature T_2 of the thermoelectric converter element on a low temperature side as to keep a relation $T_1 > T_2$, wherein: taking out an electric potential energy from a certain section of the electric conduction material constitutes a direct energy conversion electric circuit system converting from a heat energy into the electric potential energy

as required by claims 8, 11, 14, 17, 20, and 23; and

an energy direct conversion system comprising:

2n pieces of the thermoelectric converter elements adjacent to each other being disposed alternately, thus forming ambient temperatures different from each other, and a distance being secured for so keeping an ambient temperature T_1 of the thermoelectric converter element on a high temperature side and an ambient temperature T_2 of the thermoelectric converter element on a low temperature side as to keep a relation $T_1 > T_2$, wherein: taking out an electric potential energy from a certain section of the electric conduction material constitutes a direct energy conversion electric circuit system converting from a heat energy into the electric potential energy

as required by claims 9, 12, 15, 18, 21, and 24.

For at least this reason, Applicant submits that the outstanding rejection based upon the combination of Bijvoets and Kim is improper and ought to be withdrawn.

Here, Bijvoets, Yoo, and Kim, whether taken individually or in combination, fail to teach or suggest an energy direct conversion system comprising:

the first thermoelectric converter element and the second thermoelectric converter element being disposed in ambient temperatures different from each other, and a distance being secured for so keeping an ambient temperature T_1 of the thermoelectric converter element on a high temperature side and an ambient temperature T_2 of the thermoelectric converter element on a low temperature side as to keep a relation $T_1 > T_2$, wherein: taking out an electric potential energy from a certain section of the electric conduction material constitutes a direct energy conversion electric circuit system converting from a heat energy into the electric potential energy

as required by claims 10, 13, 16, 19, and 25.

For at least this reason, Applicant submits that the outstanding rejection based upon the combination of Bijvoets, Yoo, and Kim is improper and ought to be withdrawn.

Here, Bijvoets, Kim, and Pflanz, whether taken individually or in combination, fail to teach or suggest an energy direct conversion system comprising:

the first thermoelectric converter element and the second thermoelectric converter element being disposed in ambient temperatures different from each other, and a distance being secured for so keeping an ambient temperature T_1 of the thermoelectric converter element on a high temperature side and an ambient temperature T_2 of the thermoelectric converter element on a low temperature side as to keep a relation $T_1 > T_2$, wherein: taking out an electric potential energy from a certain section of the electric conduction material constitutes a direct energy conversion electric circuit system converting from a heat energy into the electric potential energy

as required by claims 28 and 31; and

an energy direct conversion system comprising:

2n pieces of the thermoelectric converter elements adjacent to each other being disposed alternately, thus forming ambient temperatures different from each other, and a distance being secured for so keeping an ambient temperature T_1 of the thermoelectric converter element on a high temperature side and an ambient temperature T_2 of the thermoelectric converter element on a low temperature side as to keep a relation $T_1 > T_2$, wherein: taking out an electric potential energy from a certain section of the electric conduction material constitutes a direct energy conversion electric circuit system converting from a heat energy into the electric potential energy

as required by claims 29 and 32.

For at least this reason, Applicant submits that the outstanding rejection based upon the combination of Bijvoets, Kim, and Pflanz is improper and ought to be withdrawn.

Here, Bijvoets, Yoo, Kim, and Pflanz, whether taken individually or in combination, fail to teach or suggest an energy direct conversion system comprising:

the first thermoelectric converter element and the second thermoelectric converter element being disposed in ambient temperatures different from each other, and a distance being secured for so keeping an ambient temperature T_1 of the thermoelectric converter element on a high temperature side and an ambient temperature T_2 of the thermoelectric converter element on a low temperature side as to keep a relation $T_1 > T_2$, wherein: taking out an electric potential energy from a certain section of the electric conduction material constitutes a direct energy conversion electric circuit system converting from a heat energy into the electric potential energy

as required by claims 30 and 33.

For at least this reason, Applicant submits that the outstanding rejection based upon the combination of Bijvoets, Yoo, Kim, and Pflanz is improper and ought to be withdrawn.

If an independent claim is nonobvious under §103, then any claim depending therefrom is nonobvious. *In re Fine*, 5 USPQ2d 1596 (Fed. Cir. 1988). See MPEP 2143.03. Thus, Applicant submits that claims 5-25 and 27-33, each of which ultimately depends from independent claims 1, 2, 3, or 4, are also non-obvious at least by virtue of their dependency from claims 1, 2, 3, or 4.

In view of the foregoing, Applicant respectfully requests reconsideration and withdrawal of the outstanding rejections under §103.

Provisional Obviousness-Type Double Patenting Rejections

On page 14 of the Office Action, the PTO has *provisionally* rejected claims 1-33 on the ground of nonstatutory obviousness-type double patenting as allegedly being unpatentable over claims 1-15 of co-pending Application No. 10/537,357. Inasmuch as this is a *provisional* rejection, Applicant respectfully requests that the PTO withdraw its obviousness-type double patenting rejections. Applicant also reserves the right to take further action should the rejection become *non-provisional*.

CONCLUSION

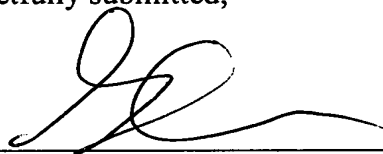
Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. § 1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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